

CLAIMS

What is claimed is:

- 1 1. A system for optimizing non-interactive three-dimensional image data comprising:
2 an optimizing encoder for generating three-dimensional rendering information optimized
3 for real-time rendering of an image having an image quality within an error criteria of an image
4 quality standard for a target computer system, and the optimizing encoder further having a model
5 representing the target computer system for performing rendering of the rendering information,
6 the target computer system represented being a type of computer system having a three-
7 dimensional renderer.
- 1 2. The system of claim 1 wherein the optimizing encoder performs an optimization of the
2 three-dimensional rendering information based upon criteria including a graphics processor
3 capability of the target computer system.
- 1 3. The system of claim 2 wherein the optimizing encoder performs an optimization of the
2 three-dimensional rendering information based upon criteria including characteristics of a
3 physical infrastructure for transferring the optimized three-dimensional rendering information to
4 the target computer system.
- 1 4. The system of claim 3 wherein the physical infrastructure is the Internet.
- 1 5. The system of claim 3 wherein the physical infrastructure is a digital versatile disc.
- 1 6. The system of claim 3 wherein the computer system is an interactive game console.
- 1 7. The system of claim 2 wherein the optimizing encoder performs an optimization of the
2 three-dimensional rendering information based upon criteria including feedback information
3 generated by the model during rendering of the three-dimensional rendering information.

1 8. The system of claim 7 wherein the feedback information includes a rendering time
2 measurement for a subset of a scene.

1 9. The system of claim 7 wherein the feedback information includes a rendering time
2 measurement for a scene.

1 10. The system of claim 7 wherein the optimizing encoder has a memory and the feedback
2 information includes rendered pixels generated by the model in rendering the optimized three-
3 dimensional rendering information.

1 11. The system of claim 7 wherein the feedback information includes command error
2 reporting.

1 12. The system of claim 7 wherein the optimizing encoder has a processor and a memory and
2 the model is a software emulation of the target computer system executing on the processor for
3 rendering three-dimensional rendering information.

1 13. The system of claim 7 wherein the model comprises a graphics processor for rendering
2 the optimized three-dimensional image data.

1 14. The system of claim 7 wherein the model is a graphics sub-system embodied in a
2 peripheral of the optimizing encoder.

1 15. The system of claim 1 wherein the optimizing encoder comprises:

2 an import unit for converting three-dimensional descriptions to an intermediate
3 format suitable for a plurality of target computer systems;

4 a multi-platform unit for generating a first optimized three-dimensional data set
5 by performing computations applicable to a plurality of target computer systems;

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6 a target-specific optimization unit for generating a second optimized three-
7 dimensional data set for a selected one of the target computer systems by performing at
8 least one optimization applicable to the selected target system; and

9 a bandwidth tuning unit for encoding the second optimized three-dimensional data
10 set in a three-dimensional protocol accounting for the characteristics of a physical infrastructure
11 from which the selected target computer system will access the second data set.

1 16. A method for optimizing non-interactive three-dimensional image data for rendering by a
2 target computer system comprising:

3 generating three-dimensional rendering information optimized for real-time rendering of
4 an image having an image quality within an error criteria of an image quality standard for the
5 target computer system, the target computer system represented being a type of computer system
6 having a three-dimensional renderer; and

7 encoding the optimized three-dimensional image data into a three-dimensional protocol.

1 17. The method of claim 16 wherein the three-dimensional protocol is a streaming protocol.

1 18. The method of claim 16 wherein generating three-dimensional rendering information
2 optimized for real-time rendering of an image having an image quality within an error criteria of
3 an image quality standard for the target computer system comprises:

4 performing an optimization based upon the graphics processor capability of the target
5 computer system.

1 19. The method of claim 16 wherein generating three-dimensional rendering information
2 optimized for real-time rendering of an image having an image quality within an error criteria of
3 an image quality standard for the target computer system comprises:

4 receiving feedback information from a rendering of the image by a model of the target
5 system; and

6 selecting an optimization to be performed based on the feedback information.

1 20. The method of claim 16 wherein the encoding of the optimized three-dimensional image
2 data into a three-dimensional protocol comprises:

3 encoding the rendering information to satisfy the bandwidth requirement of a physical
4 infrastructure used for transferring the optimized information to the target computer system.

1 21. The method of claim 16 wherein generating three-dimensional rendering information
2 optimized for real-time rendering of an image having an image quality within an error criteria of
3 an image quality standard for the target computer system comprises the following:

4 converting three-dimensional descriptions to an intermediate format suitable for a
5 plurality of target computer systems;

6 generating a first optimized three-dimensional data set by performing
7 computations applicable to a plurality of target computer systems;

8 generating a second optimized three-dimensional data set for a selected one of the
9 target computer systems by performing at least one optimization applicable to the
10 selected target system; and

11 encoding the second optimized three-dimensional data set in a three-dimensional
12 protocol accounting for the characteristics of a physical infrastructure from which the
13 selected target computer system will access the second data set.

1 22. The method of claim 21 wherein the at least one optimization is an optimization based on
2 microcode generation.

- 1 23. The method of claim 21 wherein the at least one optimization is an optimization
2 involving injecting corrective data
- 1 24. The method of claim 21 wherein the at least one optimization is an optimization based on
2 scheduling of object rendering and reordering of objects to be rendered.
- 1 25. The method of claim 21 wherein the at least one optimization is an image based
2 rendering technique.
- 1 26. The method of claim 21 wherein the at least one optimization is an optimization
2 involving deletion of unused data or delaying of rendering of data.
- 1 27. The method of claim 21 wherein the at least one optimization is an optimization
2 involving pre-computing runtime parameters.
- 1 28. The method of claim 21 wherein the at least one optimization is an optimization
2 involving optimizing assets.
- 1 29. The method of claim 21 wherein the at least one optimization is an optimization
2 involving texture creation.
- 1 30. The method of claim 21 wherein the at least one optimization is an optimization
2 involving shading computations.
- 1 31. The method of claim 21 wherein the at least one optimization is an optimization
2 involving manipulating geometry of objects within the image.
- 1 32. The method of claim 21 wherein the at least one optimization is an optimization
2 involving visibility determination of objects within the image.
- 1 33. The method of claim 21 wherein the at least one optimization is an optimization
2 involving compression.

1 34. A system for optimizing non-interactive three-dimensional image data for rendering by a
2 target computer system comprising:

3 means for generating three-dimensional rendering information optimized for real-time
4 rendering of an image having an image quality within an error criteria of an image quality
5 standard for the target computer system, the target computer system represented being a type of
6 computer system having a three-dimensional renderer; and

7 means for encoding the optimized three-dimensional image data into a three-dimensional
8 protocol.

1 35. A computer usable medium comprising instructions that when executed by a processor
2 perform the following method for optimizing non-interactive three-dimensional image data for
3 rendering by a target computer system comprising:

4 generating three-dimensional rendering information optimized for real-time rendering of
5 an image having an image quality within an error criteria of an image quality standard for the
6 target computer system, the target computer system represented being a type of computer system
7 having a three-dimensional renderer; and

8 encoding the optimized three-dimensional image data into a three-dimensional protocol.